

REMARKS

Reconsideration of the instant application is respectfully requested. The present amendment is responsive to the Office Action of February 27, 2003, in which claims 1-9 and 18 of group I are presently pending. Of the claims under consideration, claims 1 and 3 have been rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent 6,033,939 to Agarwala, et al. (Agarwala), in view of the publication entitled *Electronic Packaging and Interconnection Handbook*, by Charles A. Harper (Harper). In addition, claims 2, 4 and 6 are rejected under 35 U.S.C. §103(a), as being unpatentable over Agarwala, in view of Harper, and in further view of U.S. Patent 6,111,301 to Stamper. Claim 5 further stands rejected under 35 U.S.C. §103(a), as being unpatentable over Agarwala, in view of Harper, and in further view of U.S. Patent 6,300,233 to Lee, et al. (Lee). Finally, claims 7-9 and 18 are rejected under 35 U.S.C. §103(a), as being unpatentable over Agarwala, in view of Harper, in further view of Stamper, and in further view of U.S. Patent 5,590,460 to DiStefano, et al. (DiStefano). For the following reasons, however, it is respectfully submitted that the application is still in condition for allowance.

As was the case in the Amendment dated December 9, 2002, the Applicants again respectfully traverse each of the §103 rejections to claim 1 (and the remaining claims dependent therefrom) and request that they be withdrawn for the reason that the Agarwala reference does not disclose an organic material encapsulated underneath a conductive layer, as is particularly set forth in claim 1. As is best understood from a review of the present Office Action, the Examiner attempts to equate the BLM pads 10 of Agarwala (combined with the teachings of Harper in regard to electrically conductive interconnect balls and lines) to the conductive layer 30 of the presently claimed fuse structure. However, even this combination of references does still not result in the claimed fuse structure for several reasons.

First, the BLM pads 10 are not part of the actual fuse structure in Agarwala. As stated in column 6, line 64 through column 7, lines 4 of Agarwala:

"Using the fuse structure of FIG. 3, FIG. 4 shows sequentially deposited layers of

silicon oxide 6, silicon nitride 7 and polyimide 8 on dielectric layer 4, interconnection lines 1 and fuselink 5. Terminal via studs 9 of copper metallurgy are next formed by Damascene methods of prior art. The thin fuse structure does not interfere with the processes of stud 9 formation. Standard C4 solder balls 11 on BLM pads 10 are formed in accordance with methods of prior art."

Thus, as described in the Agarwala patent, the fuse structure is considered to include only those elements shown in Figure 3, while subsequent elements introduced in Figure 4 (such as the insulation layers 6, 7, 8, the via studs 9, and the BLM pads 10) relate to insulation, passivation and interconnection. In other words, the term "fuse structure" is used disparately from the subsequently formed structures in Figure 4.

Secondly, even if the pads 10 could be considered as part of the fuse structure, they do not encapsulate the organic fuse link 5, as is recited in the pending claims. Not only are there several insulative layers interposed between the fuse link 5 and the BLM pads 10, the pads themselves are not even disposed directly over the fuse structure 5, as can be plainly seen from Figure 4. In contrast, the conductive layer 30 of the instant application is deposited directly over the organic material 26, thereby encapsulating it. Thirdly, an application of laser energy to the "conductive" pads 10 in Agarwala would not have the effect of blowing open the fuse structure, as is the case when laser energy is applied to conductive layer 30 in the present application.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that (1) all elements of the claimed invention are disclosed in the prior art; (2) that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references; and (3) that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A.

1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Thus, under the first element, to establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Accordingly, since all of the limitations of claim 1 are not taught or suggested by the cited references (i.e., the encapsulation of organic material underneath a conductive layer), claim 1 is not rendered obvious over the combination of the Agarwala and Harper references. Furthermore, each of the rejections to the remaining claims dependent therefrom have also been overcome, and it is respectfully requested that the same be withdrawn.

Finally, with regard to the §103 rejection of claim 18, the Applicants also traverse the same. As was set forth in the Amendment of December 9, 2002, the combination of the previously cited references (Agarwala, Lee) did not teach or disclose a fuse structure having an electrically conductive, organic material that is filled within a pair of vias. In particular, it was stated that in the Lee reference, the material of the via metal layers 20 (in Figure 2A) is not the fuse material of the device, but simply the typical interconnect material used in connecting different metallization levels of a semiconductor device. It was also pointed out that the vias 20 of Lee have nothing to do with the fuse structure 40, but simply provide a vertical connection between upper level conductors 30 and lower level conductors 10.

Now, in the present office action, the Examiner has indicated that the combination of the Agarwala and DiStefano references results in the invention of claim 18, as it is stated that DiStefano discloses the use of organic material in vias (column 13, lines 4-13). Again, however, this newly cited combination of references still does not teach all of the elements of

claim 18. More specifically, neither Agarwala nor DiStefano teach the use of a via as part of the fuse structure itself. It is not enough that Agarwala and/or DiStefano both simply show vias; these vias would also have to form part of the fuse structure itself. However, neither do. Although not specifically stated as such, it is interpreted from paragraph b) on the top of page 7 of the present Office Action that the "pair of vias" referred to by the Examiner corresponds to the vias (studs) 9 in Figure 4 of Agarwala. As stated above, however, these vias 9 are not considered a part of the fuse structure 5.

Furthermore, the DiStefano patent is generally directed to components and methods utilized in fabrication of layered circuit structures such as multi-layer circuit boards. (See col. 1, lines 5-10) There is no teaching or other mention in DiStefano of either fuse structures in general or using vias as part of fuse structures. That being the case, there is also no motivation to combine the teachings of DiStefano with the teachings of Agarwala, with respect to forming a fuse structure.

Accordingly, since all of the limitations of claim 18 are not taught or suggested by the cited references (i.e., Agarwala and DiStefano), and since one skilled in the art would not be motivated to combine the two, it is respectfully requested that rejection thereto be withdrawn.

For the above stated reasons, it is respectfully submitted that the present application is now in condition for allowance. No new matter has been entered and no additional fees are believed to be required. However, if any fees are due with respect to this Amendment, please charge them to Deposit Account No. 06-1130 maintained by applicants' attorneys.

Respectfully submitted,
TIMOTHY J. DALTON, ET AL.

CANTOR COLBURN LLP
Applicants' Attorneys

By 

Sean F. Sullivan
Registration No. 38,328
Customer No. 29371

Date: May 2, 2003
Address: 55 Griffin Road South, Bloomfield, CT 06002
Telephone: (860) 286-2929

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